

# **CONVENTIONAL**

## **BALLOON FLIGHT SUPPORT APPLICATION**

### **FISCAL YEAR 2001**

The following information is requested regarding your needs for NASA/NSBF balloon flight support. Please type or print legibly and return to the NSBF. Please contact NSBF for "LDB Flight Application Form" if you're submitting for Long Duration Balloon Flights.

#### **PART I**

1. Principal Scientific Investigator: \_\_\_\_\_ David J. Thompson \_\_\_\_\_

Organization and Mailing Address: \_\_Laboratory for High Energy Astrophysics\_\_  
\_\_\_\_Code 661, NASA Goddard Space Flight Center, Greenbelt, MD 20771 \_\_\_\_\_

Telephone: \_\_ (301) 286-8168 \_\_\_\_\_ Telex or Telefax: (301) 286-1682

E-Mail Address: \_\_\_\_\_ djt@egret.gsfc.nasa.gov \_\_\_\_\_

2. Project Officer or Delegate Familiar with Engineering Aspects of Experiment:  
\_\_\_\_ same, for present \_\_\_\_\_

Organization and Mailing Address: \_\_\_\_\_  
\_\_\_\_\_

Telephone: \_\_\_\_\_ Telex or Telefax: \_\_\_\_\_

E-Mail Address: \_\_\_\_\_

3. Source of Funding (Research Grant): \_\_\_\_\_ 839-40-11-01 \_\_\_\_\_

4. I have plans for balloon launches within the periods specified on the attached letter: Yes \_\_X\_\_ ; No \_\_\_\_\_.  
If no, complete Part III and date, sign, and return the questionnaire to the NSBF.  
If yes, complete entire questionnaire and return.

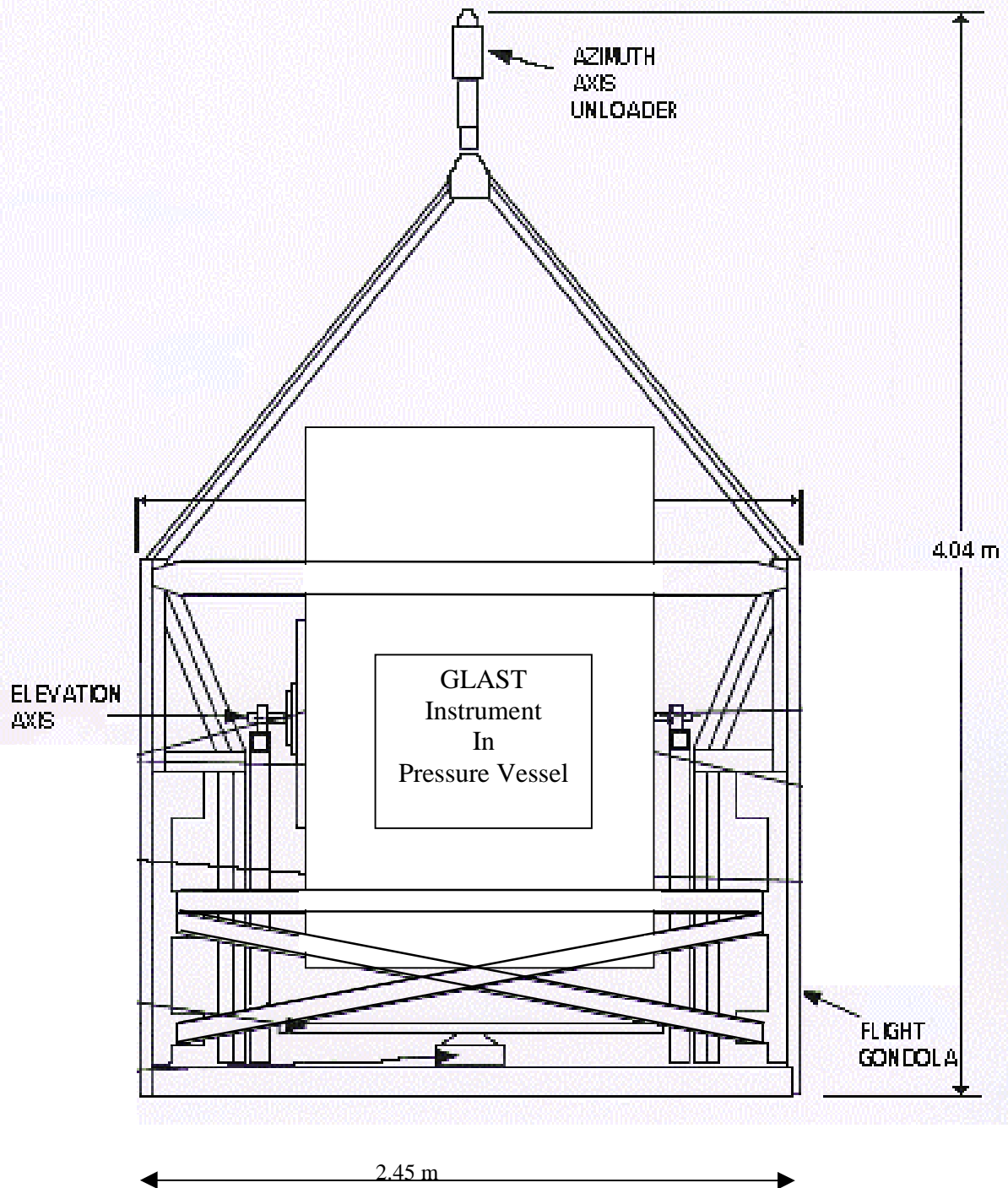
5. Number of Flights: \_\_\_\_\_ One successful \_\_\_\_\_

6. Flight Date(s): (1) \_\_\_\_\_ June, 2001 \_\_\_\_\_ (2) \_\_\_\_\_

7. Launch Site(s):(1)\_\_\_\_Palestine, TX\_\_\_\_\_
8. LaunchSite Arrival Date(s):(1)\_ May 15, 2001\_\_\_\_\_
9. Dimensions of Scientific Payload:(1)\_2.5m x 2.5 m x 4 m\_\_\_\_  
(Enclose Drawings or Photo if available)
10. Estimated Weight of Scientific Payload (experimenter-supplied equipment only including batteries):  
(1)\_\_\_Approx. 700 kg\_\_\_\_\_
11. Desired Float Altitude (feet):(1)\_\_\_\_125,000\_\_\_\_\_
12. Desired Time at Float Altitude:(1)\_\_\_8 hours\_\_\_\_\_
13. Desired Launch Time (Time of Day):(1)\_any\_\_\_\_\_
14. Describe other than normal flight profile requirements - e.g., altitude variations, ascent/descent rates, valving, payload reel down, altitude stability:  
None\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
15. The NSBF normally provides steel shot as ballast. Non-magnetic ballast, e.g., glass shot or lead shot may be used if justified by science requirements. Please indicate your requirement.  
Steel\_\_\_\_\_OK\_\_\_\_\_ Non-Magnetic\_\_\_\_\_.
16. Are there any restrictions on the proximity of the scientific payload to other equipment, electronics, ballast, or to the balloon? List any special balloon design requirements that you may be aware of e.g., no radar reflective tape, attached ducts, minimum poly powder lubrication, etc.  
None\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_
17. A. Has this payload been flown before by the NSBF?  
No\_\_X\_\_\_\_ Yes\_\_X\_\_ Site\_\_\_\_Alice Springs\_\_\_\_\_ Date\_\_several\_\_\_\_  
Last Flight Number:\_\_\_\_\_

# GRIS

## Gondola with GLAST Instrument



B. Has this payload previously been certified for flight by NSBF?

No   x   Yes   x  

C. Have any structural changes been made that affect your previous Mechanical Certification?

No            Yes   X  

EXPLAIN (IF APPLICABLE) GRIS gondola has flown before. The  
instrument is new - prototype of Gamma Ray Large Area Space  
Telescope (GLAST)

18. Required work area and shop support? 1200 sq. ft

19. Please indicate time required for use of (Environmental Test Chamber (Bemco), if any  
None

20. Gases/Cryogenics: List the quantity, type **and PURITY** of gases/cryogenics that you wish the NSBF to order in support of your program. Refer to Enclosure 5 for specific instructions.

None

21. Other Requirements: Expendables, and services other than directly required by the NSBF for its flight support must be paid for directly by the experimenter's group or from monies transferred to NASA and made available to the NSBF as described in Enclosure 2.

The NSBF will assist in determining whether these services are considered routine support. Please provide a listing of your requirements.

None

22. Payload Safety: The following is a list of hazards typically associated with balloon payloads. Please indicate which are applicable to your project.

	<u>Yes</u>	<u>No</u>
Radioactive Materials	<u>      </u>	<u>  X  </u>
Lasers	<u>      </u>	<u>  X  </u>

	<u>Yes</u>	<u>No</u>
Cryogenic Materials	_____	<u>X</u> _____
Pressure Vessel	<u>X</u> _____	_____
High Voltage	<u>X</u> _____	_____
Pyrotechnics	_____	<u>X</u> _____

Attachment 9 is the NSBF Ground Safety Plan (GSP). It delineates NSBF policies regarding hazardous materials, systems, and equipment. Please verify that the appropriate documentation and procedures are in place to comply with these policies. You will be asked to sign a "Verification of Safety Compliance" form after your arrival at the launch site.

Please indicate any additional hazardous materials, systems, or equipment not falling into the above categories (i.e. toxic gases, superconducting magnets, etc). You will be required to generate a special ground and flight safety plan to address hazards associated with these items.

\_\_\_\_\_None\_\_\_\_\_

Please attach any applicable safety documentation or plans that have been generated as part of your own institutional safety program as part of your project. Indicate below if you have or plan on submitting institutional safety documentation.

Yes\_\_\_\_\_NoX\_\_\_\_\_

If you checked "yes" under radioactive materials, will you be using the sources in:

Flight\_\_\_\_\_? Ground Support Only\_\_\_\_\_?

List radioactive sources to be used along with maximum activity/wattage. (Identify materials in C<sub>i</sub>, μC<sub>i</sub>, and/or mC<sub>i</sub>).

\_\_\_\_\_  
\_\_\_\_\_

Each scientist is required to furnish NSBF with a Sealed Source Device Registry (SSDR) Safety Evaluation Sheet to be on file at NSBF before the source can be shipped to NSBF property or remote launch site. Refer to Enclosure 2 for instructions regarding radioactive sources.

23. If hazardous materials are used, you must furnish Material Safety Data Sheets (MSDS). Are other experimenters participating with you in the flight(s) covered by this request?:

Yes\_\_\_\_X\_\_\_\_ No\_\_\_\_\_

Names and Organizations:

\_\_\_\_TBD, Stanford U., TBD U. Calif. Santa Cruz, TBD NRL, TBD, CEN Saclay (France)

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24. Please identify all participants in your group that will be supporting your flight.\*

NAME	CITIZENSHIP (a)
____Not known at the time - will be supplied	_____
_____	_____
_____	_____

a. Non-U.S. citizens will not be allowed on any launch site without prior approval. Please provide the following for each non-U.S. citizen:

1. Birthplace
2. Date of Birth
3. Passport Number
4. Country of Citizenship

\_\_\_\_\_  
\* This list must include all personnel at the launch site. In case of campaigns outside of the United States, the NSBF and NASA are required to inform the host country about the nationality of all campaign participants.

25. If this is a cooperative program, describe each party's degree of involvement:  
\_Stanford - electronics, detector assembly; Santa Cruz - tracking detector;\_\_\_\_\_  
\_NRL - calorimeter; GSFC - anticoincidence detector, gondola; \_\_\_\_\_  
\_Saclay - calorimeter, All - data analysis\_\_\_\_\_
- 

26. Briefly describe the scientific experiment and its objectives in layman language:  
GLAST is a gamma-ray telescope follow-on to EGRET on the Compton Observatory. The instrument will study gamma radiation in the 20 MeV - 300 GeV range from a wide variety of cosmic sources such as pulsars and quasars. The balloon prototype will verify the technology by measuring the atmospheric gamma radiation at high altitudes.

**Note:** The NSBF requires strict compliance with the established policy requiring all single-point failure threaded fasteners to be procured from an approved source or have a Certificate of Compliance from other sources. Single-point failure fasteners should be tested or a Certificate of Compliance provided to confirm that they are manufactured as specified. Refer to Enclosure 7 for a copy of the established policy and approved threaded fastener source list.

## **PART II**

The following information is requested regarding your requirements for NSBF electronic support of flights from the Palestine Facility or other launch sites. Any additional pertinent information not specifically requested should be attached to the Flight Request.

### **NSBF TELECOMMAND SYSTEM**

1. The NSBF telecommand system utilizes a computerized command management system at the ground station. Science commands are sent from the scientist provided remote computer to the NSBF Flight Computer COMMAND MANAGEMENT SYSTEM via RS-232 port. (See Enclosure 8 for Instructions for Command Integration.) The NSBF command system allows for a 16 bit parallel command word and a maximum of 80 discrete commands.

2. Do you plan to use your own command encoder and transmitter to meet science payload requirements? Yes\_\_\_ No X If Yes:

Frequency\_\_\_\_\_ Power \_\_\_\_\_

Authorization No.\_\_\_\_\_ Area of Authorization\_\_\_\_\_

Transmitter Antenna, omni or pointed?\_\_\_\_\_

### **AIRBORNE TELEMETRY REQUIREMENTS**

1. Indicate the nature of telemetry signals from scientific instrumentation.

SIGNAL	FREQUENCY	CODING
	(BPS)	(NRZ,Bi0,ETC)
___TBD_____	_____	_____
_____	_____	_____
_____	_____	_____

NSBF normally furnishes telemetry transmitters. If you plan to utilize your own transmitter provide the following information.

10. Scientist Furnished Transmitter? \_\_\_No\_

Frequency \_\_\_\_\_; Authorization No. \_\_\_\_\_

Area of authorization \_\_\_\_\_

3. Describe special or unusual electronic requirements, indicate constituent signals comprising science furnished composite video, indicate any TV video requiring NSBF supplied transmitters.

Electromagnetic interference testing required due to sensitive electronics  
in instrument.

### **GROUND TELEMETRY REQUIREMENTS**

**NOTE:** Analog tapes are routinely recorded on all flights and stored for a period of not less than six months.

4. Is digital tape logging required? ☒ Yes; ☐ No  
If yes, please complete Digital Data Logging Requirement Form (Enclosure 4).

5. Indicate any special requirements (ground station equipment, test equipment, etc):

\_\_\_\_\_  
\_\_\_\_\_

6. Downrange ground station support requirements:

\_\_\_\_\_  
\_\_\_\_\_

### **BATTERIES** (See Enclosure 5)

Do you want NSBF to purchase batteries for your scientific payload:

Yes: ☒ No: ☐

**NOTE:** Only lithium battery packs and cells of the type routinely used by the NSBF are available with this service. CIP power is not available for use by the scientist.



**BATTERIES AVAILABLE**  
**(Indicate desired per flight quantity)**

<u>Battery</u>	<u>Cells/Pack</u>	<u>Loaded Voltage</u>	<u>Ampere Hour</u> *	<u>Quantity Desired</u>
B7901-10	10	26	30	_____
B7901-11	11	29	30	__6 (tentative)_____
B7901-12	12	32	30	_____
B9660	10	26	7	_____
B9525	5	14	7	_____
B9808	4	11.2	1	_____
G20-12	1	2.6	7	_____
G62-12	1	2.6	30	_____

\* Ampere hour ratings should be derated for temperatures below -20 degrees centigrade.

Batteries ordered per this request will be held by NSBF only for the Fiscal Year the flight request is submitted. Should you be required to submit another Flight Application, even though you have not used the batteries originally requested, be sure to specify battery requirements.

Unless otherwise specified, batteries requested will be available at the requested launch site upon your arrival.

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### PART III Future Requirements:

Please provide detailed information on planned balloon flights beyond FY 2000 to assist the NASA/NSBF in developing flight support services. Considerable advanced planning is required for complicated missions, e.g., Australia, Canada, Antarctica, etc. Even if your plans are not firm, identifying potential requirement facilitates the planning process. Include the anticipated number of flights through Calendar Year 2001 and their locations and seasonal requirements. Also note any special support requirements and any required services or capabilities that the NSBF does not presently offer.

No flights planned beyond 2001

I have read and agree with all requirements and conditions set forth in the Balloon Flight Support Application and Enclosures.

David J. Thompson  
Name (Type or Print)

NASA/GSFC  
Organization

Signature

7/27/00  
Date

## PRE-FLIGHT SUCCESS CRITERIA

### Notes:

1. The NSBF always strives to meet the comprehensive success criterion as established by the experimenter. Therefore, unless a reasonable chance exists of meeting that criterion as stated, the flight application will be deemed unacceptable.
2. At the launch site, the NSBF will make every effort to meet the comprehensive success criterion. Under no circumstances will the NSBF attempt to launch your experiment unless the minimum success criterion can be met.

### Please type or print legibly.

1. Briefly state the minimum scientific objective which must be met to achieve a mission success.

Observe atmospheric gamma radiation at high altitude for  
at least three hours.

2. Balloon Performance Requirements:

Float Duration (Hrs) - Desired 8; Minimum Acceptable 5

Float Altitude (Ft) - Desired 125,000 Minimum Acceptable 115,000

Altitude Stability - Desired +/- 2000 Minimum Acceptable +/- 5,000

Describe other than normal flight profile requirements - e.g., altitude variations, ascent/descent rate, valving, payload reel down, altitude stability):

None

3. Define any NSBF support systems (telemetry, commanding, recovery, etc.) performance requirements with desired and minimum criteria.

No special requirements

4. Experiment Performance - Detectors, Pointing Systems, etc. (Give a summary of the desired and required performance for the experiment.

Detector subsystems should all operate successfully at float for at least one hour.

Goal is to take at least 5 hours of data at float.

5. Provide details on any other data source or support element separate from the balloon flight but necessary to achieve mission success (e.g., instrumented sounding balloons, instrumented aircraft, satellite overpass, independent ground station measurements, National Weather Service Radiosonde Data).

None

6. Proposed Data of Flight June , 2001

Launch Site Palestine

David J. Thompson

Name (Type or Print)

NASA/GSFC

Organization

Signature

Date

**WAIVER OF CLAIMS  
AGAINST THE PHYSICAL SCIENCE LABORATORY  
NEW MEXICO STATE UNIVERSITY**

With regard to Balloon Flight Services provided by New Mexico State University/Physical Laboratory, the operators of the National Scientific Balloon Facility (NSBF), under contract with the National Aeronautics and Space Administration (NASA), the requiring institution identified below, agrees not to assert any claim or claims against the New Mexico State University/Physical Science Laboratory, the National Aeronautics and Space Administration, or their employees or agents, for loss or damages to any instrument or scientific equipment (including loss of or damage to the balloon) provided by the requiring institution and carried on a Balloon Flight provided by the National Scientific Balloon Facility, or consequential damages resulting from such loss or damages, except with respect to any such loss or damages resulting solely from the fault or negligence of the New Mexico State University/Physical Science Laboratory. This waiver shall be in effect from:

\_\_\_\_\_ to \_\_\_\_\_ inclusive.  
**(Date)** **(Date)**

**Institution:** \_\_\_\_\_  
**(e.g., Agency Name, University Name, etc.)**  
\_\_\_\_\_  
**(Department, Section, etc.)**

**Name:** \_\_\_\_\_  
**(Official with authority to legally bind institution)**

**Title:** \_\_\_\_\_  
**(Title of above official)**

**Date:** \_\_\_\_\_  
**(Date official signs this document)**

Enclosure 2

# HOLD HARMLESS AND INDEMNIFICATION

The \_\_\_\_\_

—

**(Name of Institution, e.g., NASA Center, NOAA, NRL, University Name etc.)**

\_\_\_\_\_

—

agrees to Indemnify and Hold Harmless the Physical Science Laboratory of New Mexico State University (PSL/NMSU), its Regents, Officers, and employees from any liability whatsoever (including legal costs) associated with damages or death resulting from a radioactive substance provided by

\_\_\_\_\_

—

**(Name of Scientific User at NSBF)**

and carried on a balloon flight launched, flown, and recovered by PSL/NMSU National Scientific Balloon Facility (NSBF) for the

\_\_\_\_\_

**(Name of Subgroup, e.g., Department, Section, etc., at Institution)**

\_\_\_\_\_

—

whose address is

\_\_\_\_\_

—

**Name:** \_\_\_\_\_

— **(Official with Authority to Legally Bind Institution)**

**Title:** \_\_\_\_\_

— **(Official's Title at Institution)**

**Date:** \_\_\_\_\_

— **(Date Official Signs this Document)**

Enclosure 3

## DIGITAL DATA LOGGING REQUIREMENTS

NSBF has available some data logging applications software which can be tailored to many logging and real-time display requirements. Currently, this support is provided only for flights launched at Palestine, Texas. This form provides preliminary information necessary to ensure that digital logging and display requirements can be met.

If you would like post flight digitized data from analog tapes for flights launched from any site, please identify in the **Other Special Requirements Section**.

1. Recording: (800 BPI/1600 BPI)
2. Tapes Provided by Scientist: (Yes/No)
3. Can Scientist Provide assistance with changing tapes? (Yes/No)
4. Is real-time display required? (Yes/No)

5. PCM Information:

Data Rate (BPS)	_____
Bits/Word	_____
Words/Frame	_____
Frames/Major Frame	_____
Frame Sync =	_____
Sub Frame Sync =	_____
(Please attach copy of PCM format)	

6. Other Special Requirements: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

The undersigned verifies that above requirements have been tested to meet stated requirements.

\_\_\_\_\_  
(Scientist's Signature)

\_\_\_\_\_  
(Date)

Enclosure 4